CLAIMS

What is claimed:

1.   A method of placing a number of unrouted new demands on an existing network structure comprising the steps of:

5   translating the existing network to a capacity network such that it is

conducive to application of mathematical and heuristics techniques,

said capacity network being organized as a connected flat topology;

solving subsets of the unrouted new demands using min-cost flow

processes in order to route as many of the new demands onto the

10   existing network as can be accommodated by the existing network;

and

outputting a list of routed demands and unrouted demands.

2.   The method as set forth in Claim 1 wherein said step of translating the existing

network to a capacity network comprises modeling system equipment interactions

15   or transitions with transition nodes that mark the behavior of equipment within the

existing network, thereby rendering a representation of the existing network in an

operations research network flows domain.

3.   The method as set forth in Claim 1 wherein said step of solving subsets of the

unrouted new demands uses only spare capacity of the existing network for

20   routing of new demands, such that routing of all pre-existing routed demands is

maintained.

4. The method as set forth in Claim 1 wherein said step of solving subsets of the unrouted new demands uses all capacity of the existing network for routing of new demands such that pre-existing routed demands are not accommodated by a final solution.

5 5. The method as set forth in Claim 1 further comprising the steps of:

building an overlay network in response to having unroutable demands on said existing network;

routing said unroutable demands on said overlay network; and

outputting a description of said overlay network.

10 6. The method as set forth in Claim 1 further comprising the step of re-routing any existing demands.

7. A computer readable medium encoded with software for placing a number of unrouted new demands on an existing network structure, said software when executed by a computer causing the computer to perform the steps of:

15 translating the existing network to a capacity network such that it is conducive to application of mathematical and heuristics techniques, said capacity network being organized as a connected flat topology;

solving subsets of the unrouted new demands using min-cost flow processes in order to route as many of the new demands onto the

20 existing network as can be accommodated by the existing network; and

outputting a list of routed demands and unrouted demands.

8. The computer readable medium as set forth in Claim 7 wherein said software for translating the existing network to a capacity network comprises software for modeling system equipment interactions or transitions with transition nodes that mark the behavior of equipment within the existing network, thereby rendering a representation of the existing network in an operations research network flows domain.

9. The computer readable medium as set forth in Claim 7 wherein said software for solving subsets of the unrouted new demands is adapted to use only spare capacity of the existing network for routing of new demands, such that routing of all pre-existing routed demands is maintained.

10. The computer readable medium as set forth in Claim 7 wherein said software for solving subsets of the unrouted new demands is adapted to use all capacity of the existing network for routing of new demands such that pre-existing routed demands are not accommodated by a final solution.

11. The computer readable medium as set forth in Claim 7 further comprising software for performing the steps of:

building an overlay network in response to having unroutable demands on said existing network;

routing said unroutable demands on said overlay network; and

outputting a description of said overlay network.

12. The computer readable medium as set forth in Claim 7 further comprising software for re-routing any existing demands onto said existing network structure.

13. A system for placing unrouted new demands on an existing network structure, said system comprising:

5   a network translator for translating the existing network to a capacity network such that it is conducive to application of mathematical and heuristics techniques, said capacity network being organized as a connected flat topology;

     a solver for solving subsets of the unrouted new demands using min-cost

10   flow processes in order to route as many of the new demands onto the existing network as can be accommodated by the existing network, said solver receiving said translated existing network; and

     a results outputter for outputting a list of routed demands and unrouted demands.

15   14. The system as set forth in Claim 13 wherein said network translator is adapted to model system equipment interactions or transitions with transition nodes that mark the behavior of equipment within the existing network, such that said translated network is a representation of the existing network in an operations research network flows domain.

20   15. The system as set forth in Claim 13 wherein said solver is adapted to use only spare capacity of the existing network for routing of new demands, such that

routing of all pre-existing routed demands is maintained.

16. The system as set forth in Claim 13 wherein said solver is adapted to use all capacity of the existing network for routing of new demands such that pre-existing routed demands are not accommodated by a final solution.

5   17. The system as set forth in Claim 13 further comprising:

an overlay network builder for building an overlay network in response to having unroutable demands on said existing network;

an overlay network router for routing said unroutable demands on said overlay network; and

10   an overlay network description outputter for outputting a description of said overlay network.

18. The system as set forth in Claim 13 wherein said solver is further adapted to re-route any existing demands onto the existing network.